

DOWNEY BRAND LLP  
A Professional Corporation

1 DOWNEY BRAND LLP  
2 KEVIN M. O'BRIEN (Bar No. 122713)  
3 kobrien@downeybrand.com  
4 MEREDITH E. NIKKEL (Bar No. 254818)  
5 mnikkel@downeybrand.com  
6 SAMUEL BIVINS (Bar No. 300965)  
7 sbivins@downeybrand.com  
8 NICOLAS CHAPMAN (Bar No. 340661)  
9 nchapman@downeybrand.com  
10 621 Capitol Mall, 18<sup>th</sup> Floor  
11 Sacramento, California 95814  
12 Telephone: 916.444.1000  
13 Facsimile: 916.444.2100  
14  
15 Attorneys for Intervenors-Defendants  
16 TEHAMA-COLUSA CANAL AUTHORITY;  
17 and RECLAMATION DISTRICT NO. 108, et al.

18 SOMACH SIMMONS & DUNN  
19 A Professional Corporation  
20 ANDREW M. HITCHINGS (Bar No. 154554)  
ahitchings@somachlaw.com  
21 BRITTANY K. JOHNSON (Bar No. 282001)  
bjohnson@somachlaw.com  
22 JARED S. MUELLER (Bar No. 257659)  
jmueller@somachlaw.com  
23 500 Capitol Mall, Suite 1000  
Sacramento, CA 95814  
24 Telephone: (916) 446-7979  
Facsimile: (916) 446-8199  
25  
26 Attorneys for Intervenors-Defendants  
27 GLENN-COLUSA IRRIGATION DISTRICT, et al.

18 UNITED STATES DISTRICT COURT  
19 EASTERN DISTRICT OF CALIFORNIA-FRESNO DIVISION

20 PACIFIC COAST FEDERATION OF  
21 FISHERMEN'S ASSOCIATIONS, *et al.*,  
Plaintiffs,  
22 v.  
23 GINA RAIMONDO, *et al.*,  
Defendants.

Case No. 1:20-cv-00431-JLT-EPG  
Case No. 1:20-cv-00426-JLT-EPG

24 **MICHAEL DEAS DECLARATION IN  
25 SUPPORT OF SACRAMENTO RIVER  
INTERVENORS' OBJECTION TO  
26 INTERIM OPERATIONS PLAN  
EXTENSION**

27 Date: TBD  
28 Time: TBD  
Dept.: 5  
Judge: Honorable Jennifer L. Thurston

## **DECLARATION OF MICHAEL DEAS**

1. I, Michael Deas, declare that the following facts are true and correct and/or are based on my expert opinions.

4        2. I am a registered civil engineer in California. I specialize in hydrology, hydraulics,  
5 water temperature, water quality, and related areas. I am a Principal at Watercourse Engineering,  
6 Inc. (“Watercourse”), located at 424 Second Street, Suite B, Davis, CA 95616. Watercourse  
7 specializes in water resources planning and management, and water temperature and water quality  
8 analyses for federal, state, county, city, and other entities. I have been a Principal at Watercourse  
9 since its inception in 2001, and the company currently employs nine scientists and engineers. My  
10 qualifications to render the opinions contained in this Declaration are set forth in my professional  
11 resume, attached hereto as Exhibit A and incorporated herein by this reference.

12       3. Through my work experience, I am familiar with the Central Valley Project  
13 operated by the United States Bureau of Reclamation (“Reclamation”) with regards to temperature  
14 management in downstream river reaches, including operation of Shasta Lake, the Shasta Dam  
15 temperature control device (“TCD”), Keswick Reservoir and downstream Sacramento River  
16 reaches, as well as other aspects of Reclamation’s Northern District reservoirs (Whiskeytown  
17 Reservoir, Trinity Lake, Lewiston Lake) and downstream river reaches (Clear Creek and Trinity  
18 River). I have performed work for a variety of entities in these basins, including Reclamation,  
19 U.S. Geological Survey, Trinity County, and the Sacramento River Settlement Contractors. This  
20 work includes field monitoring, simulation modeling using a variety of models and approaches in  
21 support of a range of technical studies addressing flow, storage, reservoir cold water pool  
22 management, meteorology, operations, climate change, and other activities as they relate to water  
23 temperature management. In addition, I have completed related flow, temperature, and water  
24 quality studies and analyses in basins throughout California and in the Pacific Northwest that  
25 contribute to my understanding of flow and storage-related temperature management analyses.

4. Outlined herein is an analysis developed in cooperation with Lee Bergfeld, principal at MBK Engineers to evaluate the operation of Shasta Lake to meet alternative temperature targets in 2022 as opposed to those determined by the Shasta Planning Group under

1 the 2022 IOP. Three simulations were completed, commencing on March 22, 2022, at midnight,  
2 each with a starting storage of 1.719 million acre-feet and an initial vertical water temperature  
3 profile estimated as the average of the two profiles collected by Reclamation on March 15 and  
4 March 30, 2022. Meteorology was assumed equal to the 2015 field conditions, as were inflow  
5 temperatures to Shasta Lake. 2015 has been used in past forecasts in the Sacramento River system  
6 because it represents adverse meteorological conditions for reservoir and stream heating. Using  
7 this information and the hydrology and operations provided by Mr. Bergfeld, water temperature  
8 releases from Shasta Dam were completed using the U.S. Army Corps of Engineers model CE-  
9 QUAL W2<sup>1</sup> and the application of the model to Shasta Lake<sup>2</sup>.

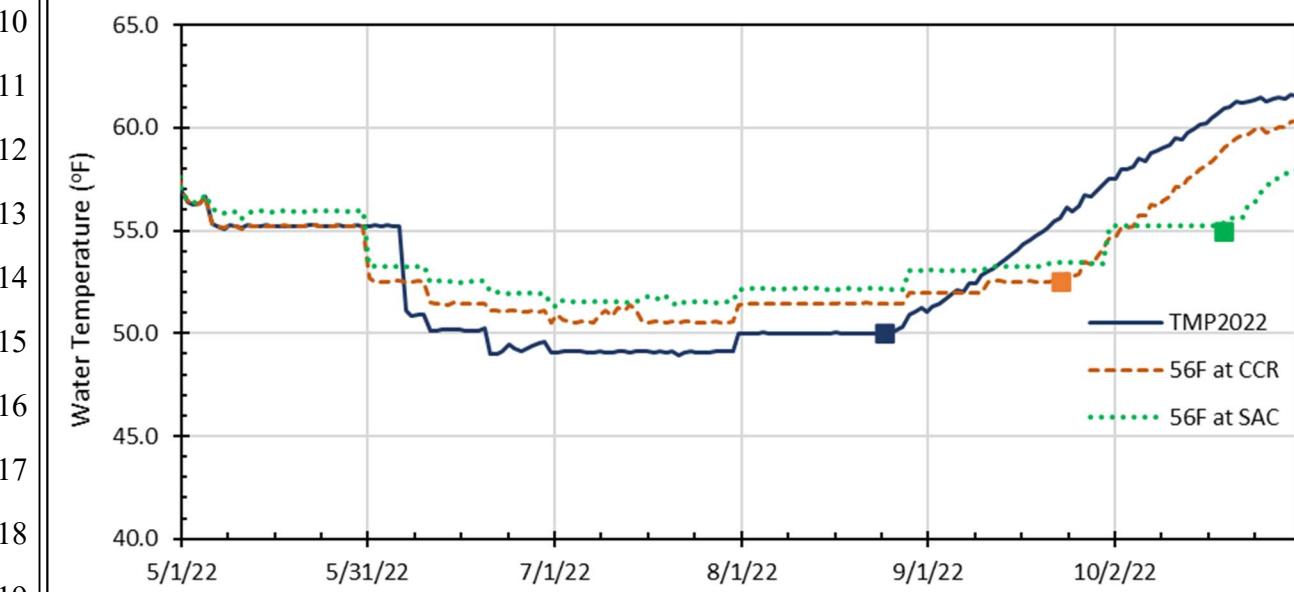
10 5. The first simulation was an operation of the TCD at Shasta Dam that attempts to  
11 meet the temperature targets described in the final temperature management plan (“TMP”)  
12 submitted by Reclamation to NMFS on May 2, 2022. The second was an operation of the TCD  
13 that attempts to meet a temperature target of 56 degrees Fahrenheit (°F) in the Sacramento River  
14 upstream of Highway 44. A temperature target of 56°F upstream of Highway 44 is similar to the  
15 temperature management operation that occurred in 2015. Results from both simulations show a  
16 loss of temperature control at Shasta Dam occurs prior to the end of the temperature management  
17 season on October 31st. Results from the simulation with the temperature targets in the final TMP  
18 are generally consistent with results in the final TMP. The results from the simulation with a  
19 temperature target of 56°F upstream of Highway 44 show the loss of temperature control occurred  
20 over seven weeks later than the simulation with final TMP temperature targets. Finally, a third  
21 simulation was completed with a 56°F temperature target at Clear Creek, the temperature  
22 compliance location in 2014 and 2015, which shows the loss of temperature control occurred  
23 approximately four weeks later than the simulation with final TMP temperature targets. For the  
24 purposes of this report, the loss of temperature control is when the TCD operations transition to

25 \_\_\_\_\_  
26 <sup>1</sup> Cole, T.M. and S.A. Wells. 2008. CE-QUAL-W2: A Two-Dimensional Laterally Averaged  
27 Hydrodynamic and Water Quality Model, Version 3.6 - User Manual. Instructional Report EL-08-  
1. Prepared for the U.S. Army Corps of Engineering. Washington DC. August 2008.

28 <sup>2</sup> Deas, M.L., I.E. Sogutlugil, A.E. Bale, and S.K. Tanaka. 2020. Shasta Lake and Keswick  
Reservoir Flow and Temperature Modeling - Development Report. December 2020.

1 the side gates alone (and all other gates in the TCD are closed and both side gates are open), at  
 2 which point typical TCD operations no longer provide a measure of operational control of Shasta  
 3 Dam release temperatures. In 2022, the date corresponding to the side gates operating alone in  
 4 actual operations was August 22.<sup>3</sup>

5       6.     Each simulation has a different tailbay temperature to attain the downstream  
 6 identified temperature target at the location (or locations). Heating rates from Shasta Dam,  
 7 through Keswick Reservoir, and conveyance through the Sacramento River are based on historic  
 8 conditions. The three simulations are presented as a comparative analysis, wherein model results  
 9 are compared with model results to ascertain the relative difference between assumptions.

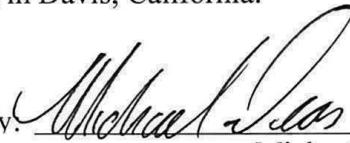


21       Figure 1. Three model simulations representing operations of the 2022 temperature management plan  
 22 (TMP2022), to meet 56°F at Clear Creek (55F at CCR), and to meet 56°F upstream of Hwy 44 (SAC).  
 23       Square symbols denote simulated loss of temperature control.

24  
 25  
 26  
 27  
 28       <sup>3</sup> Email from Thomas K. Patton, Civil Engineer, U.S. Bureau of Reclamation, to Michael Deas,  
 Principle, Watercourse Engineering Inc., (Aug. 22, 2022, 09:50 PST) (on file with Declarant).

1 I declare under penalty of perjury under the laws of the United States of America that the  
2 foregoing is true and correct.

3 Executed this 31 day of October, 2022, in Davis, California.

4  
5 By: 

6 Michael Deas  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28

# EXHIBIT A

## Michael L. Deas

---

Watercourse Engineering, Inc.  
424 Second Street, Suite B  
Davis, CA 95616  
(530) 750-3072  
mike.deas@watercourseinc.com

### EDUCATION

Doctor of Philosophy, 2000, University of California, Davis, Civil and Environmental Engineering

Major: Environmental Fluid Mechanics

Minor: Water Resources Planning and Management

Dissertation: Application of Numerical Water Quality Models in Ecological Assessment

Master of Science, 1989, University of California, Davis, Civil and Environmental Engineering

Major: Water Resources

Thesis: Unconfined-confined groundwater modeling of perched aquifers

Bachelor of Science, 1986, University of California, Davis, Civil Engineering

### CURRENT POSITION

Principal, Watercourse Engineering, Inc.

### BACKGROUND

Dr. Deas has extensive professional experience in the field of water quality monitoring, modeling, and analysis. His Ph.D. work focused on environmental fluid mechanics. He has taught water quantity and quality modeling courses at the University of California, Davis, and is a coauthor of a review of Central Valley water temperature modeling for the Bay Delta Modeling Forum. As a consultant and researcher, he has continued to apply his education to a wide range of problems including surface flow, temperature, and water quality assessments; formulating conceptual models and identifying the interactions between aquatic system elements; developing and applying analytical tools as well as complex numerical models to evaluate flow and the fate and transport of physical and chemical constituents in aquatic systems; and providing technical presentations, both orally and in writing, for diverse audiences. He has worked throughout Central and Northern California on reservoirs, rivers, and estuaries.

Recent projects that Dr. Deas has worked on include:

- Development and application of a flow and temperature models for Shasta Lake and Keswick Reservoir spanning a simulation period 2000-2018. Models developed in a stakeholder process – a modeling technical committee – through approximately bi-monthly meetings detailing model selection, data, assumptions, calibration/validation, and other model development activities. Process included documenting all model results and distribution of final report.
- Development and application of a spatially and temporally detailed study of the Klamath River basin. These numerical models represent flow and full water quality conditions for multiple years on sub-daily time steps (e.g., hourly) at small spatial scales (e.g., 100 to 400 meters). The various modeling elements cover over 250 miles of the Klamath River, and over 110 miles of the Trinity River, including several reservoirs.
- Development of the Water Temperature Transaction Tool (W3T), a fully documented model, peer-reviewed model, adopted by the Oregon Department of Environmental Quality and applied in California, Oregon, Washington, Idaho and Montana.
- Development of logic for numerical/analytical modeling of organic matter, phytoplankton and benthic algae forms, pH and alkalinity representation, and topographic and riparian shading logic for water temperature simulations. Such logic has been used in several model applications and studies over the past few years.

### PROFESSIONAL EXPERIENCE

Provided professional engineering services for water quantity and quality issues associated with river and reservoir systems. Project management activities include developing and managing budgets and schedules, allocation resources to complete work, oversight, and reporting. Typical project work includes:

- Basin-scale flow and water quality modeling for river and reservoir reaches in the Klamath River basin (PacificCorp)

- Physical characterization of spatial and temporal variability of flow and temperature within thermal refugia for over-summering anadromous fishes on the Klamath River (U.S. Bureau of Reclamation in cooperation with the Yurok and Karuk Tribe).
- Flow and water temperature modeling (Water Temperature Transaction Tool, W3T) in support of instream flow transactions. (National Fish and Wildlife Foundation)
- Basin-scale water temperature modeling in the Tuolumne River (HDR, Inc.)
- Middle Fork American River Water temperature model representing river and reservoir systems (Placer County Water Agency)
- Shasta River Safe Harbor temperature modeling (Cal Trout)
- Shasta River and Big Springs flow and temperature assessment (The Nature Conservancy)
- Development and application of a Sierra Nevada region-wide temperature model (RTEMP) (U.C. Davis)
- Keno Reservoir water quality modeling and analysis assessing eutrophication status and remedy (U.S. Geological Survey and U.S. Bureau of Reclamation)
- Shasta River flow and temperature modeling for anadromous fish restoration (United States Fish and Wildlife Service and California Department of Fish and Game)
- Water quality model application to assess eutrophication potential within the Crystal Springs Reservoir complex (City of San Francisco for Merritt Smith Consulting)
- Central Valley water temperature modeling review (Bay Delta Modeling Forum)
- Trinity Lake, Lewiston reservoir, and Trinity River hydrodynamic and temperature modeling (U.S. Bureau of Reclamation, Trinity County)

Senior Engineer, Earth Science Associates, 1992-93.

Designed, constructed, tested, and applied a monthly operations model of the Los Angeles Department of Water and Power Mono Basin – Owens Valley Aqueduct System (Los Angeles Aqueduct Simulation Model). Implemented a long-term computer model maintenance program. Performed water supply analysis for various clients.

Consulting Engineer, Los Angeles Department of Water and Power - 1991, 1993.

Co-managed Mono Basin – Owens Valley computer modeling project. Formulated and implemented system operation model for Los Angeles' eastern Sierra Nevada water gathering facilities. Participated in a UCLA-Mono Basin public policy program mediation effort, and served on technical advisory committees for the State Water Resources Control Board (State Board) water rights re-issuance hearings for Los Angeles. Testified before the State Board concerning predictive computer models for the Mono Basin and Owens River Basin.

Assistant Engineer, Aqueduct Division, Los Angeles Department of Water and Power, 1989-90.

Revamped and expanded the Mono Basin computer model from a spreadsheet to a FORTRAN program capable of assessing a wide range of scenarios. Conducted various studies examining the impact of alternative operations and hydrologic conditions on Mono Lake surface elevations and water supply to Los Angeles. Reviewed water rights issues and made recommendations to legal staff.

Civil Engineer, Hydrologic Engineering Center, U.S. Army Corps of Engineers, 1987.

Researched and formulated a report on the Corps responsiveness to the 1986 drought in the southeastern United States. The report, titled "Lessons Learned from the 1986 Drought" compiled information learned from the drought and presented specific recommendations for drought contingency planning.

#### RESEARCH EXPERIENCE

Co-Principal Investigator, Assessment of Restoration Actions on Big Springs Creek, Shasta River, California 2009-2010. University of California, Davis, Center for Watershed Sciences. 2008-10. Funded by National Fish and Wildlife Foundation.

Research evaluated the response of aquatic vegetation, geomorphology, hydrology, hydraulics, water temperature, water quality, and fish assemblage and habitat usage over a 12-month period from April 2009 through March 2010. Restoration response was assessed by comparing conditions identified during the project period (2009-2010) to pre-restoration conditions. The evaluation showed that post-restoration changes to the size and spatial extent of aquatic vegetation communities throughout Big Springs Creek were the primary agents behind critical restorative changes observed in the baseline monitoring elements, and had the greatest impact on stream morphology, water

temperatures, fish habitat, and fish ration – all important conditions for salmonids. Shared Principal Investigator (PI) role with Peter Moyle and Jeff Mount of U.C. Davis.

Co-Principal Investigator, Longitudinal Baseline Assessment of Salmonid Habitat Characteristics of the Shasta River, March through September, 2008. University of California, Davis, Center for Watershed Sciences. 2008-10. Funded by California State Water Resources Control Board.

The comprehensive longitudinal baseline assessment included detailed field observations of hydrology, geomorphology, water temperature, water quality, aquatic macrophytes, benthic macroinvertebrates, and salmonid habitat utilization. This integrated suite of physical, chemical, and biological observations provided a robust characterization of the necessary elements required to assess salmonid conditions in the Shasta River, as well as identify potential directions for restoration and maintenance of salmonids in the basin. Important in this research is that although discrete elements were assessed, the physical, chemical, and biological elements were highly integrated, with clear inter-dependencies important to salmonid restoration. Shared Principal Investigator (PI) role with Peter Moyle and Jeff Mount of U.C. Davis.

Co-Principal Investigator, Baseline Assessment of Salmonid Habitat and Aquatic Ecology of the Nelson Ranch, Shasta River, California Water Year 2007. University of California, Davis, Center for Watershed Sciences. 2007-09. Funded by U.S. Bureau of Reclamation.

Project presents a baseline assessment that identified the first multidisciplinary approach to studies in the Shasta Valley, providing a framework for an integrated evaluation of physical and biological factors affecting the various salmonid life stages present throughout an annual period. Shared Principal Investigator (PI) role with Peter Moyle and Jeff Mount of U.C. Davis.

Project Manager, Klamath River water temperature and water quality modeling project. University of California, Davis. (United States Fish and Wildlife), 6/95 – 12/99.

Application of hydrodynamic and water quality models to analyze water quality control alternatives designed to improve anadromous fisheries in the Klamath River downstream of Iron Gate Dam. Simulated dissolved oxygen, temperature, nutrients, and algal dynamics. Alternative included varying timing and quantity of reservoir releases as well as retrofitting outlet works to allow selective withdrawal for downstream temperature control.

Project Manager, Shasta River Flow and Temperature Modeling Project. University of California, Davis. (California State Water Resources Control Board, 205(j) Clean Water Act Grant Program, 3/95 – 6/98.

Project included modeling flow and water temperature on the Shasta River for anadromous fish restoration efforts. Subtasks included hydrology, meteorology, water temperature data inventory and woody riparian vegetation inventory. Modeling included examining the impact of spring flow accretions, diversions, return flow, and riparian shading on this small river system. Designed and implemented temperature monitoring program.

Project Manager, Sacramento River Temperature Modeling Project. University of California, Davis. (California State Water Resources Control Board, 205(j) Clean Water Act Grant Program, 3/95 - 3/97.

Managed a team of engineers to implement and apply computer models to analyze the potential for temperature control in reaches critical for salmon reproduction downstream of Central Valley Project (CVP) reservoirs. Project team completed application of finite difference models of major CVP reservoirs – Lake Shasta and Trinity Lake; and implemented, calibrated, and verified one-dimensional finite element hydrodynamic and water temperature models for Keswick Reservoir, and the Sacramento and Feather Rivers.

Research Engineer, Putah Creek Coarse Sediment Evaluation below Monticello Dam (University of California, Davis Public Service Research Program), 6/95-8/96

Designed and completed field monitoring program to examine morphological changes to Putah Creek. Field work and associated research revealed that direct effects of Monticello Dam include creek aggradation due to tributary sediment contributions, as well as tributary down-cutting due to reduced post-project stream levels.

Project Manager, Willits Bypass Floodplain Study. University of California, Davis. (California Department of Transportation), 4/94 - 6/95.

Applied a two-dimensional finite element hydrodynamic model to an inundated floodplain with coalescing streams in Little Lake Valley near Willits, California. Verified and applied model for 100-year flood event to examined

impacts of alternative freeway alignments on floodplain dynamics. Determined over-crossings (bridge) and drainage requirements to maintain backwater effects to less than 1.0 feet, where possible.

#### TEACHING EXPERIENCE

Instructor, University of California, Davis, Extension. Current.

Critical Thinking – Instructor for training level class for working professionals in water resources. Subject matter focused on working definitions, critical thinking and science applications, and case studies.

Associate Instructor, Department of Civil and Environmental Engineering, University of California, Davis, Spring 1999, Spring 2001.

Environmental Quality Modeling (Civil and Environmental Engineering 244) – Instructor for graduate course addressing mathematical modeling of environmental water quality. Subject matter focused on structure, capabilities/limitations, sensitivity and reliability of water quality models as analytical tools.

Lecturer, U.S. Army Corps of Engineers. July 1999, July 2000.

Water and the Watershed – Hydrologic, Environmental, and Ecological Modeling.

Provided lecture and materials to Corp of Engineers' planners, economists, and biologists from district offices nationwide. Topics include fundamentals critical to computer modeling at the watershed level as well as case studies.

Associate Instructor, Department of Civil and Environmental Engineering, University of California, Davis, Fall 1997.

Unsteady Flow in Surface Waters (Civil and Environmental Engineering 277) –

Instructor for graduate course covering topics of unsteady flow. Subjects included long waves in surface flow, St. Venant equations, method of characteristics, explicit and implicit finite difference methods, stability of numerical schemes, and flood routing techniques.

Teaching Assistant, University of California, Davis, 1986-88, 1993, 1996.

Duties included preparing lectures, designing homework assignments, administering and grading tests, evaluating student performance, and assigning grades. Classes include:

- Engineering 3: Introduction to Engineering (lab)
- Engineering 35: Statics (discussion)
- Civil and Environmental Engineering 10: Introduction to Surveying (lab)
- Civil and Environmental Engineering 141L: Hydraulics (lab)
- Civil and Environmental Engineering 145: Design of Open Channel Structures (class)
- Civil and Environmental Engineering 152: Civil Engineering Planning (class)
- Civil and Environmental Engineering 271: Water Resources Planning Lab (class)

#### COMPUTER SKILLS

Programming: FORTRAN

Water Resources Related Software: RMA2, RMA11, HEC-5Q, CE-QUAL-W2, ADYN, RQUAL, WQRSS, QUAL2-R1, QUAL2K, CE-QUAL-RIV, W3T, HeatSource, MINTEQ.

#### REFERRED JOURNALS

Mejica, B.N, D.A. Ebert, S.K. Tanaka, M.L. Deas. Managing cyanobacteria with a water quality control curtain in Iron Gate Reservoir, California. In submission: Lake and Reservoir Management.

Jeffers, C., A. Nichols, R. Lusardi, M. Deas, J. Mount, P. Moyle, R. Dahlgren. Geologic Subsidies Drive High Productivity in Volcanic Spring-Fed Streams. In submission: Environmental Biology of Fishes.

Power, M.E., S.J. Kupferberg, S.D. Cooper, and M.L. Deas. 2016. Chapter 33. Rivers. In H. Mooney and E. Zavaleta (Eds), Ecosystems of California (pp 713-754). Oakland, CA: University of California Press.

Oliver, A. A., R. G. M. Spencer, M. L. Deas, and R. A. Dahlgren. 2016. Impact of seasonality and anthropogenic impoundments on dissolved organic matter dynamics in the Klamath River (Oregon/California, USA), J. Geophys. Res. Biogeosci., 121, doi:10.1002/2016JG003497

Willis, A.D., A.L. Nichols, C.A. Jeffres, A.C. Fowler, C.A. Babcock, M.L. Deas. 2015. Seasonal aquatic macrophytes reduce water temperatures via a riverine canopy in a spring-fed stream. Freshwater Science. 2017. 36(3):000-000.

Willis, A., Campbell, A., Fowler, A., Babcock, C., Howard, J., Deas, M., and Nichols, A. 2015. "Instream Flows: New Tools to Quantify Water Quality Conditions for Returning Adult Chinook Salmon." *J. Water Resour. Plann. Manage.*, 10.1061/(ASCE)WR. 1943-5452.0000590, 04015056.

Oliver, A.A., R.A. Dahlgren, M.L. Deas. 2014. "The upside-down river: Reservoirs, algal blooms, and tributaries affect temporal and spatial patterns in nitrogen and phosphorus in the Klamath River, USA." *Journal of Hydrology*. 519, 164-176.

Nichols, A.L., A.D. Willis, C.A. Jeffres and M.L. Deas. 2013. *Water Temperature Patterns Below Large Groundwater Springs: Management Implications for Coho Salmon in the Shasta River, California*. River Research and Applications. Wiley Online Library. DOI: 10.1002/rra.2655.

Null, S.E., J.H. Viers, M.L. Deas, S.K. Tanaka, J.F. Mount. 2013. *Stream temperature sensitivity to climate warming in California's Sierra Nevada: impacts to coldwater habitat*. Climatic Change. DOI 10.1007/s10584-012-0459-8.

Null, S.E., M.L. Deas, J.R. Lund. 2009. "Flow and Water Temperature Simulation for Habitat Restoration in the Shasta River, California." *River Research and Applications*. May.

McCullough, D.A., J.M. Bartholow, H.I. Jager, R.L. Beschta, E.F. Cheslak, M.L. Deas, J.L. Ebersole, J.S. Foott, S.L. Johnson, K.R. Marine, M.G. Mesa, J.H. Petersen, Y. Souchon, K.F. Tiffan, and W.A. Wurtsbaugh. 2009. "Research in Thermal Biology: Burning Questions for Coldwater Stream Fishes." *Reviews in Fisheries Science*. 17(1):90-115.

Sutton, R.J., M.L. Deas, S.K. Tanaka, T. Soto, R.A. Corum. 2007. "Salmonid observations at a Klamath River thermal refuge under various hydrological and meteorological conditions." *River Research and Applications*. 23: 775-785.

#### PEER REVIEW PANELS AND AGENCY REPORTS

California Water & Environmental Modeling Forum (CWEMF). 2021. Protocols for Water and Environmental Modeling. November 19. (available online: <https://cwemf.org/wp/wp-content/uploads/2021/11/Modeling-Protocols-Report-Final-11-19-2021.pdf>)

State Water Resources Control Board. Delta Water Quality Modeling Science Work Group. Group: M.L. Deas (Chair), E. Danner, C. Foe, W. Fleenor, M. Guerin, E. Ateljevich, C. Enright, L. Thompson, J. Domogalski, P. Hutton. Purpose: produce a white paper identifying appropriate models, modeling, and intuition framework to support long-term water quality modeling in the Delta related to Regional Board (V) nutrient objectives. 2015.

Sullivan, A.B., Sogutlugil, I.E., Deas, M.L., and Rounds, S.A., 2014, Water-quality modeling of Klamath Straits Drain recirculation, a Klamath River wetland, and 2011 conditions for the Link River to Keno Dam reach of the Klamath River, Oregon: U.S. Geological Survey Open-File Report 2014-1185, 75 p.

Sullivan, A.B., Sogutlugil, I.E., Rounds, S.A., and Deas, M.L., 2013, Modeling the water-quality effects of changes to the Klamath River upstream of Keno Dam, Oregon: U.S. Geological Survey Scientific Investigations Report 2013-5135, 60 p.

Sullivan, A.B., Rounds, S.A., Asbill-Case, J.R., and Deas, M.L., 2013, Macrophyte and pH buffering updates to the Klamath River water-quality model upstream of Keno Dam, Oregon: U.S. Geological Survey Scientific Investigations Report 2013-5016, 52 p.

State Water Resources Control Board. Mono Basin Facilitated Process. Technical team member. Purpose: address unresolved technical issues in the Mono Basin. 2013.

Anderson, J.J., L. Crozier, M.L. Deas, R. Hinrichsen, K. Rose. 2012. *Independent Review of SALSIM 2, Salmon Simulator*. Organized by the U.C. Davis Project Review Office for the Ecosystem Restoration Program, implemented by the California Department of Fish and Game, U.S. Fish and Wildlife Service and the National Marine Fisheries Service. March 26.

Sullivan, A.B., Rounds, S.A., Deas, M.L., and Sogutlugil, I.E., 2012, Dissolved oxygen analysis, TMDL model comparison, and particulate matter shunting--Preliminary results from three model scenarios for the Klamath River upstream of Keno Dam, Oregon: U.S. Geological Survey Open-File Report 2012-1101, 30 p.

Sullivan, A.B., Rounds, S.A., Deas, M.L., Asbill, J.R., Wellman, R.E., Stewart, M.A., Johnston, M.W., and Sogutlugil, I.E., 2011, Modeling hydrodynamics, water temperature, and water quality in the Klamath River upstream of Keno Dam, Oregon, 2006-09: U.S. Geological Survey Scientific Investigations Report 2011-5105, 70 p.

Sullivan, A.B., Deas, M.L., Asbill, J., Kirshtein, J.D., Butler, K., and Vaughn, J., 2009, *Klamath River water quality data from Link River Dam to Keno Dam, Oregon, 2008*: U.S. Geological Survey Open File Report 2009-1105, 25 p.

Anderson, J.J., M.L. Deas, P.B. Duffy, D.L. Erickson, R. Reisenbichler, K.A. Rose, P.E. Smith. 2009. *Independent Review of a Draft Version of the 2009 NMFS OCAP Biological Opinion*. CALFED Science Review Panel. January 23. 52 p.

Sullivan, A.B., Deas, M.L., Asbill, J., Kirshtein, J.D., Butler, K., Wellman, R.W., Stewart, M.A., and Vaughn, J., 2008, Klamath River Water quality and acoustic Doppler current profiler data from Link River Dam to Keno Dam, 2007: U.S. Geological Survey Open File Report 2008-1185, 24 p.

CALFED Science Program. 2008. *Temperature Management and Modeling Workshop in Support of an Operations Criteria and Plan Biological Assessment and Biological Opinion*. Prepared for Michael Healey, CALFED Lead Scientist, by M.L. Deas (Panel Chair), P. Goodwin, S. Lindley, C. Woodley, and T. Williams. April 1.

CALFED Science Program. 2005. *Review of the Biological Opinion of the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan*. Prepared for Johnnie Moore, Lead Scientist, California Bay-Delta Authority. Prepared by J.A. Lichatowich, J. Anderson, M. Deas, A. Giorgi, K. Rose, and J. Williams. December.

Deas, M.L., J. Bartholow, C. Hanson, C. Myrick. 2004. *Peer Review of Water Temperature Objectives Used as Evaluation Criteria for the Stanislaus – Lower San Joaquin River Water Temperature Modeling and Analysis*. Prepared for AD Consultants under CALFED – CBDA Project Number: ERP-02-P08. June.

#### **SELECTED TECHNICAL REPORTS**

Willis, A.D., M.L. Deas. 2014. Water Rights Management: Options to Address Instream Water Temperatures. Report prepared for: The Nature Conservancy. 34 pp.

Holmes, S.R., Willis, A.D., Nichols, A.L., Jeffres, C.A. Deas, M.L., Purkey, A. 2013. Water Transaction Monitoring Protocols: Gathering information to assess instream flow transactions. Prepared for the National Fish and Wildlife Foundation. December, 2013. 45 pp.

Deas, M.L., A.E. Bale, A. Willis. 2013. Water Temperature Transaction Tool (W3T): Technical and User's Guide (v1.0). Prepared for the National Fish and Wildlife Foundation (NFWF). August 31.

Willis, A.D., Nichols, A.L., Jeffres, C.A., Deas, M.L., 2013. Water Resources Management Planning: Conceptual Framework and Case Study of the Shasta Basin. Report prepared for: National Fish and Wildlife Foundation.

Resource Management Associates, Inc. and Watercourse Engineering, Inc., 2010. San Joaquin River Electrical Conductivity Balance. Prepared for U.S. Bureau of Reclamation, Mid-Pacific Region. January 7.

Nichols, A.L., C.A Jeffres, A.D. Willis, N.J. Corline, A.M. King, R.A. Lusardi, M.L. Deas, J.F. Mount, and P.B. Moyle. 2010. Longitudinal Baseline Assessment of Salmonid Habitat Characteristics of the Shasta River, March to September, 2008. Report prepared for: United States Bureau of Reclamation, Klamath Basin Area Office.

Jeffres, C.A., A.L. Nichols, A.D. Willis, M.L. Deas, J.F. Mount, and P.B. Moyle. 2010. Assessment of Restoration Actions on Big Springs Creek, Shasta River, California 2009-2010. Report prepared for: National Fish and Wildlife Foundation.

Jayasundara, N., M. Deas, S. Tanaka, and A. Willis. 2010. Development of a Flow and Temperature Model for the Hetch Hetchy Reach of the Upper Tuolumne River. Prepared for the Natural Resources Division of the San Francisco Public Utilities Commission. December 12.

AD Consultants, Resource Management Associates, Inc., Watercourse Engineering, Inc. 2009. San Joaquin River Basin Water Temperature Modeling and Analysis. Prepared for CALFED, ERP-06D-S20. October.

Sullivan, A.B., M.L. Deas, J., Asbill, J.D. Kirshtein, K. Butler, and J. Vaughn. 2009. Klamath River water quality data from Link River Dam to Keno Dam, Oregon, 2008: U.S. Geological Survey Open File Report 2009-1105, 25 p.

Tanaka, S.K., L. Basdekas, M.L. Deas. 2009. Large spatial scale water temperature modeling – range wide application to the Sierra Nevada. Prepared for the Watershed Sciences Center, University of California, Davis. January.

Deas, M.L., 2008. Nutrient and Organic Matter Fate and Transport in the Klamath River: June to September 2007. Prepared for PacifiCorp. November.

Mahugh, S, M.L. Deas, R.A. Gearheart, J. Vaughn, R. Piaskowski, and A. Rabe. 2008. Keno Reservoir Feasibility Study, Phase II – Identification and Assessment of Potential Treatment Wetland Sites in the Upper Klamath River. Prepared for the U.S. Bureau of Reclamation, Klamath Basin Area Office. Proposal No. 07SF200051. June 18. 49 pp.

Basdekas, L. and M.L. Deas. 2007. Sierra Nevada High Elevation Hydropower and Climate Change: Temperature Simulation. Prepared for The Center for Watershed Sciences, University of California, Davis. July.

AD Consultants, Resource Management Associates, Inc., Watercourse Engineering, Inc. 2006. Stanislaus – Lower San-Joaquin River Water Temperature Modeling and Analysis. Prepared for CALFED ERP-02-P28. October.

Tanaka, S.K., M.L. Deas, S. Null. 2005. STREAM and LAASM: Models for Mono Basin Operations (Draft). Prepared for the Los Angeles Department of Water and Power. July.

Vignola, A., and M.L. Deas. 2005. Lake Shastina Limnology. Prepared for the Information Center for the Environment, Department of Environmental Science & Policy, University of California, Davis, and the North Coast Regional Water Quality Control Board. April.

Deas, M.L. 2004. Anderson Reservoir Re-operation Study: Water Quality Assessment. Prepared with Merritt Smith Consulting. Submitted to the Santa Clara Valley Water District. March.

Watercourse Engineering, Inc. 2004. Klamath River Modeling Framework to Support the PacifiCorp Federal Energy Regulatory Commission Hydropower Relicensing Application (including Appendices). Prepared for PacifiCorp. March 9.

San Francisco Public Utilities Commission (SFPUC). 2002. SFPUC Reservoir Water Quality Management Plan. Prepared with Merritt Smith Consulting. March.

Watercourse Engineering, Inc. 2002. Surface Water Quality Modeling: An Introduction. Prepared for the State of California, State Water Resources Control Board. April.

Deas, M.L. and C.L. Lowney. 2001. Water Temperature Modeling Review: Focusing on California's Central Valley. Bay Delta Modeling Forum Technical Publication 01-2.

San Francisco Public Utilities Commission (SFPUC). 2001. Water Quality Investigation and Assessment Report: Potential Water Quality Effects in Lake Merced from Enhanced Ammonia Inputs. Prepared with Merritt Smith Consulting. October.

Los Angeles Aqueduct Simulation Model. 1993. Prepared in cooperation with the Los Angeles Department of Water and Power, Aqueduct Division - Operations Section. September.

Coufal, E.L. and M.L. Deas. 1990. Mono Lake Water Balance Model (LADWP90). Los Angeles Department of Water and Power, Aqueduct Division - Hydrology Section. June.

Johnson, W.K. and M.L. Deas. 1987. Lessons learned from the 1986 drought. IWR Policy Study 88-PS-1, Water Resources Support Center, U.S. Army Corps of Engineers, Fort Belvoir, VA.

#### **PROFESSIONAL ACTIVITIES AND AWARDS**

Advisory Committee, Department of Civil & Environmental Engineering, University of California, Merced, at large member (Current). Assist department faculty and staff in strategic areas of education, research, and outreach.

Klamath Basin Monitoring Program (KBMP) – steering committee (Co-chair (2016-2019)

California Water and Environmental Modeling Forum Steering Committee member (2002-present)

Hugo B. Fisher Award (2015). California Water and Environmental Modeling Forum

Peer Review of the California Department of Fish and Game San Joaquin River Salmon Population Model (2006), California Bay Delta Authority

Independent Science Review Team – Temperature Effects on Salmonids in the Lower Clackamas River, Oregon (2006), sponsored by Portland Gas and Electric

Peer Review Panel for setting temperature objectives for anadromous fish in the Stanislaus River: Chairman (2003-2004), CALFED

Nathaniel Bingham Memorial Award, U.S. Fish and Wildlife (2001)

Water Quality Modeling Panel: Member (1998), Klamath River Technical Working Group

Journal Peer Review, Water Resources Research (ongoing)

#### **REGISTRATIONS, PROFESSIONAL SOCIETIES, AFFILIATIONS, AND LICENSES**

Registered Professional Civil Engineer, State of California (1990), #45624

Sigma Xi – Member

American Society of Civil Engineers (ASCE)

American Water Resources Association (AWRA)

American Geophysical Union (AGU)

North American Lake Management Society (NALMS)

American Fisheries Society (AFS)

Society for Freshwater Science (SFS)